

Does Exchange Rate Depreciation Matter In Foreign Trade In Nigeria?

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Abstract

The study interrogated the effect of depreciation in exchange rate on foreign trade in Nigeria from 1986 to 2020, with ex-post facto research design adopted. Theoretical framework of the study was anchored on the Elasticity Approach-Marshall-Lerner condition theory. To achieve the objectives of the research, econometric analytical method based on the Auto-Regressive Distributed Lag (ARDL) model was engaged to estimate the variables under consideration. Variables specified in two models used in the study were exports and imports as the dependent variables, while exchange rate, gross domestic product, interest rate and private domestic investment were employed as independent variables. The results showed that exchange rate exerted a positive but insignificant effect on exports while it had a negative and significant impact on imports in the short-run; and in the long-run, it influenced imports positively and significantly. The above results imply that any economic policy capable of raising exchange rate depreciation by 1% will increase exports of Nigeria by 0.08% in the short-run and 0.14% in the long-run. The results also imply that 1% increase in the depreciation of exchange rate would decline imports by 1.1% in the short-run, and improve imports by 1.3% in the long-run, and this effect appears to indicate that Nigeria had highly inelastic foreign import demand. Therefore, the study recommended for the intensification of exchange rate policies that target improved exports of the nation. This can be done by encouraging through low interest loans, massive oil production to meet Nigeria's quota and non-oil products such as agricultural products, agro-allied industries, and encourage small and medium scale industries; as well as refine crude oil domestically for exports to strengthen exchange rate of the nation.

Keywords: Does, Exchange, Rate, Depreciation, Matter, Foreign, Trade.

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I. Introduction

International trade among countries, Nigeria among surfaced due to differences in factor proportion. Some countries are endowed with capital intensity while others have labour intensity. Those with capital intensity specialized in the production and exportation of capital intensive commodities while the ones endowed with labour intensity engaged in exportation of labour intensive commodities. Foreign trade is accomplished via exchange rate. Thus, exchange rate is the key determinant of import and export activities in foreign trading. It is a critical macroeconomic variable used as a yardstick for the determination of foreign competitiveness; and it is conceived as an indicator of currency competitiveness in the foreign exchange market (Danladi, Akomolafe, Babalola & Akpan, 2015).

Demand for and supply of foreign currency determines the rate of exchange of a country. If the demand for foreign exchange exceeds the supply of the foreign exchange, it results in exchange rate depreciation and vice-versa. Depreciation in exchange rate brings about improvement in the exports volume and decreases imports volume, while appreciation leads to increase in imports and declines exports of a nation. According to Marshall-Lerner condition due to Marshall (1923) and Lerner (1944), exchange rate depreciation would improve trade balance of a country, if the sum of elasticities of imports and exports in relation to exchange rate is greater than one.

The advocates of the trade/elasticities model including Robinson (1947) and Metzler (1948) conceived exchange rate depreciation or devaluation as a condition necessary and sufficient for improvements in balance of trade as regards to elasticities of demand and supply. The authors postulated that if the demand and elasticities are sufficiently large enough and the supply elasticities sufficiently small enough, depreciation will improve trade balance of the nation. This implies that an increase in exchange rate depreciation has a positive influence on net export inflows in the economy. Nigeria, has in an attempt to improve net exports and maintain

balance in both the external and internal trade, devalued or depreciated its exchange rate through either fixed or floated exchange rate regime (Danladi, Akomolafe, Babalola & Akpan, 2015).

Theoretically, the idea of foreign trade is rooted in the trade theories of Smith (1776) in his book titled “An Inquiry into the Nature and Causes of the Wealth of Nations”, in which he unveiled the importance of specialization in international trading; and that of Ricardo (1817) in 1817 in his book titled, “Political Economy and Taxation” which unraveled the theory of comparative cost advantage. The international trade idea of the comparative advantage theory becomes imperative in view of the differences in endowments of financial capital, technical capabilities and natural resources among nations (Adeleye, Adeteye & Adewuyi, 2015). Accordingly, the widely embrace of the globalization concept recently in the world trade has in no small measure, left all nations with no other option than to rely on each other for assistance in their developments (Oke, Adeniji & Odugbemi, 2018). As a result, trade among countries becomes inevitable as nations must import goods and services not produced in the domestic economy (Adeleye, Adeteye & Adewuyi, 2015 cited in Oke, Adeniji & Odugbemi, 2018).

Like other countries of the world, Nigeria, over many decades now has been engaged in foreign trade. Yet, it has not been able to harness the full potentials of foreign trade for higher productivity and rapid transformation of the economy; probably because of its low degree of participation and share in global trade (Kanu & Nwadiubu, 2020). This may not be unconnected to the economy’s inelastic foreign import demand, as well as the float-managed exchange rate system operated in the economy, which has resulted in exchange rate depreciation. With the persistent depreciation in exchange rate, one expects that foreign trade engagement of the country would help to improve trade balance of Nigeria. But the reverse is the case, as the economy is characterized by trade balance deficits, low rates of investment, low productivity, sustainable economic growth, low exports, and instability in price level.

In spite of the efforts on the part of the government, the naira exchange rates against foreign currencies, US dollar in particular have persistently depreciated without any significant effect of such depreciation translated into the trade balance and growth of the nation. For instance, the naira exchange rate depreciated from ₦0.6702 per US dollar in 1982 to ₦19.6609 per dollar in 1992; and in 2002, the exchange rate further depreciated to ₦120.9793 per USD. By 2012 and 2018, the naira exchange rate against the US dollar depreciated further to ₦155.9402 and ₦306.7095, respectively and currently stood at ₦307 per dollar (CBN, 2019). On the other hand, the exports and imports recorded a negative growth rates of 25% and 16.1%, respectively in 1982; and by 1992, the growth rate of export increased to 69.2% while imports growth rate rose to 58.8% in the same period. In 2002, the exports growth rate again recorded a negative growth rate of 6.6%, whereas imports growth rate increased to 37.9% at the same period. Furthermore, the exports and imports of Nigeria had negative growth rates of 0.64% and 11.2%, respectively in 2012; and however, the exports and imports recorded positive growth rates of 6.4% and 52.1%, respectively in 2018.

From the trend analyses, it is clear that the trend of trade balance and exchange rate depreciation in Nigeria consistently did not follow a priori expectations in which it was postulated that a depreciation or devaluation of exchange rate improves the trade balance. This assertion is rooted in a partial and static equilibrium approach to the payments balance, which is now, referred to as the elasticity approach (Bickerdike, 1920; Robinson, 1947; Metzler, 1948). If this trend path is violated as is the case of Nigeria, it leads to lower investment, decline in aggregate demand, low productivity, balance of payments deficit, lower exports, and high import dependent as well as lost of social welfare, among others. It is against this problem, that the study examines the effect of persistent depreciation in exchange rate on foreign trade of Nigeria.

II. Literature Review

The Heckscher-Ohlin trade theory

The trade theory of Heckscher-Ohlin also known as the theory of factor proportion was a brain child of Eli Heckscher in the year 1919; and promulgated by Bertin Ohlin in 1933. The theory was the first to systematically explain international trade; by pointing out the reason for differences in the relative cost of commodities among nations. The earlier trade theories focused on the gains from trade and lay emphasis on the various questions of trade policies, but ignored how a condition of differences in comparative costs set in. However, the classical idea of external trade was criticized by Bertin Ohlin in his book published in 1933. Hence, the scholar came up with factor endowment or factor proportion theory to explain foreign trade. This theory occupy place in the modern theory of foreign trade in the globe. The Heckscher-Ohlin trade theory viewed international trade in terms of factor endowments. The theory explained that relative factor abundance of nations is better suited to the production of the good that employs relatively large quantity of the abundant resources. A good that needs more intensive use of the more abundant resources would often be cheaper than another. In overall, the Heckscher-Ohlin trade theory classifies rationale for international trade into labour and capital resources endowments. It argued that countries having abundant capital resources should produce and export goods that they have abundant capital resources, while those having abundant labour resources should

maintain the production and the exportation of the goods for which they have abundant labour resources. In so doing, international trade would emerge between countries and all nations would benefit from trade.

The elasticity approach

This elasticity approach came into existence with the creative work of Robinson (1947) and Metzler (1948) and expanded on by Kreuger (1983). The approach looks at the adjustment path of trade balance based on demand elasticities for imports and exports. The approach modeled nominal export and import prices as functions of the quantities of exports and imports due to Bickerdike (1920). Hence, it is referred to as Bickerdike-Robinson-Metzler (BRM) condition.

The theory is also rooted in the Marshall-Lerner condition due to Marshall (1923), and Lerner (1944). It postulated that exchange rate depreciation positively affected trade balance, only if the absolute value of the sum of the elasticities of demand for exports and imports is greater than one. However, the elasticity approach was criticized by focusing on partial equilibrium approach. According to Kim (2009), the macroeconomic effects results from price variations and fluctuations in production due to devaluation in the domestic currency. The theory emphasized only the volume and value responses of price changes. In contrary, the monetary and absorption approaches relate exchange rate depreciation to macroeconomic variables, and asserted that the positive effect of depreciation in exchange rate on the balance of trade is undermined. In overall, the absorption approach merged the elasticities approach with the Keynesian macroeconomics approach to exchange rate depreciation and trade balance.

In summary, the elasticities approach looked at the responsiveness of demand for imports and exports to increase in the depreciation of exchange rate. If the sum value of the coefficients of imports and exports is greater than one, it implies that the depreciation in exchange rate improves trade balance and it is beneficial in the economy. In Nigeria, the persistent depreciation in exchange rate appears to be caused by persistent growth in import demands or inelastic import demand.

Empirical Review

Mourou and Ngolali (2021) evaluated the impact of exchange rate on foreign trade in Congo from January, 2000 to December, 2019 using Generalized Autoregressive Conditional Heteroskedasticity (GARCH) technique. The variables used in the investigation were real exports, real imports and exchange rate, where exports and imports were employed as the dependent variables while exchange rate is used as the explanatory variable. The results showed that short-run dynamics negatively discouraged with both imports and exports in Congolese economy. By implication, it implies that Congolese should be more focus on direct domestic currency while trading with its partners. The study as reviewed is unique for its ability to look into the exchange rate volatility and foreign trade using GARCH technique. However, the study ought to have tested for the status of the time series employed in the investigation; and this is the gap this research stands to fill in the course of this study.

Yaya (2021) employed threshold non-linear ARDL model to evaluate the impact of real exchange rate on trade balance in Cote d'Ivoire from 1975 to 2017. The variables modeled in investigation include trade balance as a ratio of GDP, domestic real GDP, world real GDP, real effective exchange rate and dummy variable. The unit root test conducted showed evidence of mixed order integration among the variables. The results indicated that real exchange rate had an asymmetric effect in both time regimes. Particularly, the results revealed that appreciation in real exchange rate had negative influence on trade balance while depreciation in exchange rate improves trade balance. More so, the effect of higher depreciation is higher when compared with higher appreciation. Milos, Predrag, Danijela and Miroslav (2020) examined the impact of exchange rate depreciation on exports in the Western Balkan and Central and Eastern European countries from 1990 to 2016, by employing content analysis. The study revealed that economic crisis in those countries that utilized own currency insignificantly adjusted its trade deficit through depreciation in exchange rate. The study concluded that during global economic crisis, exchange rate depreciation had an insignificant impact on balance of payments deficit.

Naomi, Tersoo and Abubakar (2021) studied the significant effect of imported intermediate inputs on manufactured exports in Nigeria with consideration of the role of dual exchange rate regime for the period ranging from 2000Q₁ to 2018Q₄. The research utilized stationarity test, co-integration test, vector error correction model, impulse response function and variance decomposition in the analysis. The results of the impulse response analysis indicated a negative and insignificant response from imported intermediate inputs to manufacturing export. The results estimated showed a positive and significant effect of exchange rate spread on exports. The results of the variance decomposition revealed that in addition to own shocks, the changes in manufacturing export were due to shocks in imported intermediate inputs and spread of exchange rate.

Yu (2020) utilized an extended Mundell-Fleming model in the Chilean economy. The study revealed that fiscal policy expansion declines output but result in real exchange rate appreciation while monetary policy

expansion improves output and causes real exchange rate depreciation. It was also indicated that a higher real stock price or a lower real interest rate leads to improvement in output. More so, a higher rate of real interest or a higher real stock price causes real exchange rate appreciation. Apart from the negative effect of fiscal expansion on output, other predictions of the Mundell-Fleming model are applicable to Chilean economy.

Olumuyiwa and Olusola (2020) investigated the asymmetric effect of changes in exchange rate on cross-border trade in Nigeria from 1973 to 2015, through the application of non-linear autoregressive distributed lag (NARDL) model. Time series data on export divided by import, exchange rate depreciation and appreciation based on exchange rate regimes, real domestic income and trading partner country were analyzed in the study. The results showed that exchange rate appreciation had a negative and significant influence on cross-border trade. Therefore, the research concluded that real effective exchange rate had asymmetric effect on cross-border trade in the economy. This indicated that exchange rate depreciation and appreciation of equal degree had no equal effect on cross-border trade.

Lateef (2020) carried out research on the impact of volatility of exchange rate on crude oil export of Nigeria's markets such as Italy, USA, Spain, UK, Canada, France and Brazil for the period 2006M01-2019M12. The research employed unit root test, autoregressive distributed lag (ARDL) model, and Generalized Autoregressive Conditional Heteroskedasticity (GARCH) method. The results of the ARDL model indicated that exchange rate volatility of Nigeria's trading partners is significant but with different degrees, implying that exchange rate volatility between Nigeria and its trading partners is crucial in the determination of crude oil exports of Nigeria. The results also revealed that real exchange rate had a significant effect on crude oil exports of Nigeria.

More so, Sajad and Javed (2020) did study on the influence of exchange rate changes on trade balance in India for the period 1996-2017, through the application of stationarity test, non-linear ARDL model, and cumulative dynamic multiplier. Time series data on trade balance, real gross domestic product, foreign demand and real exchange rate were analyzed. The results showed no evidence of J-curve conditions in India. This indicates that, in the short-run, appreciation in exchange rate had a negative and significant impact on trade balance while exchange rate depreciation improves trade balance in India. Similarly, in the long-run, the same responses were revealed, though only exchange rate depreciation indicated significant.

Plamen and Xuan (2019) investigated the effect of effective exchange rate movements on trade balance adjustment in Turkey from 1981 to 2018 by employing autoregressive distributed lag (ARDL) model and non-autoregressive distributed lag (NARDL) model. Time series data on real exports, real imports, real exchange rate and domestic income were analyzed in the study. The results showed that real effective exchange rate is significant determinant of foreign trade in the economy. Contrarily, its influence is not symmetric in secular regimes of depreciation and appreciation. Thus, it usually has negative impact on trade flows growth differential between trade partners.

Safet (2017) did a research on the effect of real effective exchange rate depreciation on the trade balance of Albania for the period 1994-2015 using quarterly data. The study employed ARDL bounds test, vector error correction model and impulse response function in the analysis. The variables utilized in the investigation include gross domestic product, real exchange rate and trade balance. The results showed evidence of a long-term cointegration between exchange rate depreciation and trade balance. Specifically, the results indicated that exchange rate depreciation has a positive influence on trade balance of Albania in both the long-run and short-run, which shows a weak presence of the J-curve effect.

III. Methods

The study adopted ex-post research design, mainly to investigate cause and effect relationship between the variables in which the researcher cannot manipulate because it already exists. This research design becomes imperative because the study involves time series data. The auto-regressive distributed lag (ARDL) model would be employed in the analysis. Data obtained from the Central Bank of Nigeria statistical bulletin on exports, imports, exchange rate, gross domestic product, interest rate and private domestic investment are used in the estimation.

Model Specification

The specification of the model of this study follows the theoretical framework of Bickerdike-Robinson-Metzler (BRM) Elasticity Approach-Marshall-Lerner condition with modifications. The model identified depreciation in exchange rate as a condition for improvement in trade balance.' Differentiating and inserting the results in elasticity form; a general algebraic condition is derived. This condition illustrates the response of the trade balance to exchange rate changes and the domestic and foreign price elasticities of imports and exports as:

$$\frac{dB}{dE} = P_x X^s \left| \frac{(1+\epsilon)\eta^*}{(\epsilon+\eta)} \right| - \dots L (\epsilon + 1) \quad 1$$

Where; η and ε represent the price elasticities (in absolute values) of domestic demand for imports and supply of exports; η^* and l depict the respective foreign price elasticities. In that, if $B = 0$ (initial equilibrium), then $dB/dE > 0$ if and only if

$$(\varepsilon + \eta)(\varepsilon + \eta) \tag{2}$$

This model was utilized by Safet (2017) with modifications in the investigation of the impact of exchange rate movements on international trade. The modified model as used in the research by Safet (2017) is expressed below:

$$TB = f(EXR, GDP) \tag{3}$$

Where; TB = trade balance, EXR = real exchange rate, and gross domestic product. In view of this theoretical exposition, derived from the BRM model, the study further modified the Safet (2017) model by employing exchange rate as the explanatory variable, knowing full well that the variable has consequential effect on foreign trade (disaggregated), which happened to be the dependent variable. Other variables such as gross domestic product, interest rate, and private domestic investment used as the explanatory variables are employed as proximate determinants of foreign trade (control variables). Hence, the model modified and expressed in functional form, linear function and logarithm function in equations 1 to 6 below.

Equation 1

$$EXP = f(EXR, GDP, INR, PDI) \tag{1}$$

Where; EXP is the exports; EXR is the exchange rate, GDP is the gross domestic product, INR is the interest rate and PDI is the private domestic investment.

In linear form, it is as follows:

$$EXP = \beta_0 + \beta_1 EXR_t + \beta_2 GDP_t + \beta_3 INR_t + \beta_4 PDI_t + U_t \tag{2}$$

The log function of the equation is illustrated as:

$$LEXP = \beta_0 + \beta_1 LEXR_t + \beta_2 LGDP_t + \beta_3 LNR_t + \beta_4 LPDI_t + U_t \tag{3}$$

Equation 2

$$IMP = f(EXR, GDP, INR, PDI) \tag{4}$$

Where; IMP is the exports; EXR is the exchange rate, GDP is the gross domestic product, INR is the interest rate and PDI is the private domestic investment.

In linear form, it is:

$$IMP = \beta_0 + \beta_1 EXR_t + \beta_2 GDP_t + \beta_3 INR_t + \beta_4 PDI_t + U_t \tag{5}$$

The log function of the equation is specified thus:

$$LIMP = \beta_0 + \beta_1 LEXR_t + \beta_2 LGDP_t + \beta_3 LNR_t + \beta_4 LPDI_t + U_t \tag{6}$$

A priori expectation

The a priori expectation will assume the following form: $\phi_1 > 0, \phi_2 > 0, \phi_3 < 0, \phi_4 > 0$.

IV. Results and Discussions

Stationarity Test

The summaries of the Augmented Dickey-Fuller (ADF) PP unit root test results at both levels and first differences are contained in table 1 below.

Table 1: ADF Unit Root Test
Trend and Intercept

Variables	Levels		First Differences		Remarks	Rank
	ADF Statistic	5% Critical Value	ADF Statistic	5% Critical Value		
LEXP	-2.219622	-3.548490	-6.485566	-3.552973	Stationary	I(1)
LIMP	-2.941511	-3.548490	-8.832827	-3.552973	Stationary	I(1)
LTTV	-2.577063	-3.548490	-7.517537	-3.552973	Stationary	I(1)
LEXR	-2.039064	-3.548490	-6.684104	-3.552973	Stationary	I(1)
LGDP	-0.233266	-3.548490	-4.295724	-3.552973	Stationary	I(1)
INR	-3.863930	-3.548490	- - -	-----	Stationary	I(0)
LPDI	-0.505281	-3.548490	-4.519194	-3.552973	Stationary	I(1)

Sources: Researcher’s computation from E-view 9

Tables 1 represent the results of the ADF unit root test for the time series used in the investigation. The results indicate that all the variables including LEXP, LIMP, LTTV, LEXR, LGDP, and LPDI except INR were non-stationary at levels since their ADF statistics were less than their critical values. However, the non-

stationary series become stationary at first differencing. Hence, they are integrated of the order one. This means the covariance, variance and mean of the variables are constant over time.

Auto-Regressive Distributed Lag (ARDL) Model Test

ARDL Short-run and Long-run Coefficients Tests

The estimation procedure is employed to investigate the short-run and long-run dynamics of the variables under study. The results are as shown below.

Table 2: ARDL Bounds Test for equation 1
Null hypothesis: There is no existence of a long-run relationship

Test Statistic	Value	K		
F-statistic	6.617300	4		
Critical Value Bounds				
Significance	I0 Bound	I1 Bound		
10%	2.45	3.52		
5%	2.86	4.01		
2.5%	3.25	4.49		
1%	3.74	5.06		

Source: Researcher's compilation from E-view 9

The bound test is carried out to determine whether there is significant long-run relationship among the variables in the specified model. The test sets to reject the H_0 of no significant long-run among the variables, if the value of the F-statistic is greater than 5 percent upper critical Bounds value. Using the Bounds testing methodology at 6 percent level of significance, the null hypothesis of no long-run relationship is rejected since the value of the F-statistic of 6.617300 is greater than the upper critical Bounds value of 4.01. Therefore, the study rejects the H_0 and concludes that there is evidence of long-run relationship among the variables utilized in the model.

Table 3: ARDL Short-run Coefficients Test for equation 1

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LEXR)	0.080773	0.155435	0.519658	0.6077
D(LGDP)	2.445690	0.635800	3.846633	0.0007
D(INR)	-0.000010	0.015124	0.000674	0.9995
D(LPDI)	0.554066	0.258842	-2.140555	0.0419
CointEq(-1)	-0.580115	0.111092	-5.221939	0.0000

*Note: p-values < 0.05 critical value, reject null hypothesis

Source: Researcher's compilation from E-view 9

Table 3 depicts the short-run coefficients test results of the ARDL model in which the variables under consideration were estimated. From the short-run coefficients test, the results revealed that exchange rate has a positive and insignificant effect on exports; while gross domestic product and private domestic investment have a positive and significant influence on exports. Similarly, the results showed that interest rate has a negative and insignificant impact on exports in the short-run.

Evidence of these claims is supported by the coefficients and the p-values of the estimated variables from the short-run coefficients test of the ARDL model. From the results, the coefficients of LEXR, LGDP, INR, and LPDI are 0.080773, 2.445690, -0.000010, and 0.554066, respectively whereas their p-values are 0.6077, 0.0007, 0.9995, and 0.0419, respectively. More so, the results showed speed of adjustment [ECT(-1)] value of -0.580115 and p-value of 0.0000, which is statistically significant at 5 percent level of significance. The ECT(-1) estimation result represents speed of adjustment which is in line with the granger representative theorem which states that a negative and statistically speed of adjustment is necessary condition for a significant long-run relationship while the negative sign satisfies the second-order condition, and the p-value (significance) satisfies other condition required for the application of econometric procedures in the study. These results are in line with the findings of Yaya (2021), Sajad and Javed (2020), etc. The studies discovered that exchange rate exert a positive and significant impact on exports in the various countries of the study. However, the estimation results are in contrary to the results of Mourou and Ngolali (2021), Milos, Predrag, Danijela and Miroslav (2020), etc.

Table 4: ARDL Long-run Coefficients Test for equation 1

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXR	0.139236	0.265973	0.523498	0.6051
LGDP	1.973559	0.622635	3.169688	0.0039
INR	-0.074706	0.030210	-2.472884	0.0203
LPDI	0.955096	0.434341	-2.198954	0.0370
C	-3.817729	1.964450	-1.943409	0.0629

Source: Researcher's compilation from E-view 9

Table 4 above demonstrates the long-run coefficients test results of the ARDL model in which the coefficients of the variables under investigation were estimated. From table 6, the results indicated that exchange rate has a positive and insignificant impact on exports whereas gross domestic product and private domestic investment have a positive and significant effect on exports of Nigeria. In the same vein, the results revealed that interest rate has a negative and significant influence on exports in the long-run in the economy. Similarly, these claims are evidenced by the p-values and coefficients of the estimated variables obtained from the long-run coefficients test of the ARDL model. From the results, the coefficients of LEXR, LGDP, INR, and LPDI are 0.139236, 1.973559, -0.074706, and 0.955096, respectively and their associated p-values include 0.6051, 0.0039, 0.0203, and 0.0370, respectively. More so, From the result estimated, the coefficient of exchange rate in the short-run is 0.080773 and its p-value is 0.6077; while in the long-run, the coefficient and p-value of the exchange rate are 0.139236 and 0.6051, respectively. These results indicate that exchange rate at 5 percent level of significance have an insignificant and positive effect on exports in both the short-run and the long-run. The positive sign indicated by the coefficient (LLEXR) met the a priori expectation of the study. More so, these results are in line with the findings of Yaya (2021), Sajad and Javed (2020), etc. The studies discovered that exchange rate exert a positive and significant impact on exports in the various countries of the study. However, the estimation results are in contrary to the results of Mourou and Ngolali (2021), Milos, Predrag, Danijela and Miroslav (2020), etc.

Table 5: ARDL Bounds Test for Equation 2
Null hypothesis: There is no existence of a long-run relationship

Test Statistic	Value	K		
F-statistic	8.861203	4		
Critical Value Bounds				
Significance	10 Bound	11 Bound		

10%	2.45	3.52		
5%	2.86	4.01		
2.5%	3.25	4.49		
1%	3.74	5.06		

Source: Researcher's compilation from E-view 9

From the results, the value of F-statistic is 8.861203 with upper bound critical value of 4.01. Since the value of F-statistic of 8.861203 exceeds 4.01 upper bounds critical value, the study rejects the H_0 and concludes that evidence of long-run equilibrium long-run relationship is found among the variables modeled in the study.

ARDL short-run and long-run coefficients tests

Table 6: ARDL Short-run Coefficients Test for Equation 2

Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LIMP(-1))	-0.158818	0.166121	-0.956040	0.3553
D(LIMP(-2))	-0.197967	0.098040	-2.019259	0.0630
D(LEXR)	0.223301	0.149196	1.496696	0.1567
D(LEXR(-1))	-1.096126	0.205378	-5.337107	0.0001
D(LGDP)	-0.359740	0.413122	-0.870783	0.3986
D(LGDP(-1))	-2.472827	0.520035	4.755115	0.0003
D(INR)	-0.042470	0.011557	-3.674777	0.0025
D(INR(-1))	0.024385	0.011098	-2.197278	0.0453
D(INR(-2))	-0.024610	0.013752	-1.789506	0.0952
D(LPDI)	1.149182	0.240833	4.771699	0.0003
D(LPDI(-1))	-0.639256	0.270295	-2.365036	0.0330
D(LPDI(-2))	-0.564334	0.247104	-2.283794	0.0385
CointEq(-1)	-0.553522	0.137248	-4.032997	0.0012

Source: Researcher's compilation from E-view 9

From the short-run coefficients test results of the ARDL model presented in table 12, exchange rate (LEXR) at lag zero has an insignificant and positive influence on imports (LIMP) while at lag one, exchange rate (LEXR)(-1) has a negative and significant influence on imports. The results also showed that gross domestic product (LGDP) at lag zero has a negative and insignificant effect on imports whereas at lag one, gross domestic product LGDP(-1) exert a negative and significant impact on imports in the short-run in Nigeria.

In the same vein, the results indicated that interest rates (INR) at lag zero has a negative and significant effect on imports while interest rate at lag one (INR)(-1) has a positive and significant influence on imports; and at lag two, interest rate (INR)(-2) has a negative and insignificant influence on imports in the short-run. Similarly, the results revealed that private domestic investment (LPDI) at lags zero, has a positive and significant impact on imports while at lags one and two, private domestic investment [i.e. (LPDI)(-1) and (LPDI)(-2)] have a negative and significant effect on imports of the country in the short-run. Despite the involvement of lags in the results, the study considers only the lags that satisfied the goals of this investigation in terms of statistically significant or meeting the a priori expectation of the study.

Evidently, the above claims are supported by the p-values and the coefficients of the regression model. From the results, coefficients of LEXR, LEXR(-1), LGDP, LGDP(-1), INR, INR(-1), INR(-2), LPDI, LPDI(-1), and LPDI(-2) are respectively include 0.223301, -1.096126, -0.359740, -2.472827, -0.042470, 0.024385, -0.024610, 1.149182, -0.639256, and -0.564334, respectively; whereas their associated p-values are 0.1567, 0.0001, 0.3986, 0.0003, 0.0025, 0.0453, 0.0952, 0.0003, 0.0330, and 0.0385, respectively. Furthermore, the results showed speed of adjustment [(ECT)(-1)] value of -0.553522 and its p-value of 0.0012, which is significant at 5% level of significance. The ECT(-1) value reveals that the speed of adjustment of the short-run disequilibrium, which can be corrected towards long-run equilibrium relationship annually is 55.4%. The significance of the ECT(-1) satisfies all conditions while the negative sign satisfies all necessary conditions. The results are in accordance with the discovery of Sajad and Javed (2020). The study found that exchange rate had a positive and significant effect on exports in the various countries of the study.

Table 7: ARDL Long-run Coefficients Test for Equation 2

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LEXR	1.288745	0.276650	4.658395	0.0004
LGDP	-3.345570	1.273171	-2.627745	0.0199
INR	-0.040836	0.026363	-1.549004	0.1437
LPDI	-2.894247	0.905039	3.197925	0.0064
C	13.103413	4.589861	2.854860	0.0127

Source: Researcher's compilation from E-view 9

From the results, exchange rate has a positive and significant influence on imports while gross domestic product and private domestic investment exert a negative and significant impact on imports of Nigeria. The results also showed that interest rate has a negative and insignificant effect on imports in the long-run in the economy. More so, these claims are backed up by the parameters and the p-values of the estimated variables generated from the long-run coefficients test of the ARDL model. From table 16, the coefficients of LEXR, LGDP, INR, and LPDI are 1.288745, -3.345570, -0.040836, and -2.894247, respectively; and their corresponding p-values are 0.0004, 0.0199, 0.1437, and 0.0064, respectively.

Table 8: Diagnostic Tests

S/N	Diagnostic test	Obs*R-squared	Prob. Chi-Square(2)	Remarks
1.	Serial Correlation LM Test	2.018409	0.1554	No evidence of serial correlation in the model
2.	Heteroskedasticity Test: ARCH	0.462047	0.4967	No evidence of heteroscedasticity in the model

Source: Researcher's compilation from E-view 9

Stability test –CUSUM and CUSUM of Square

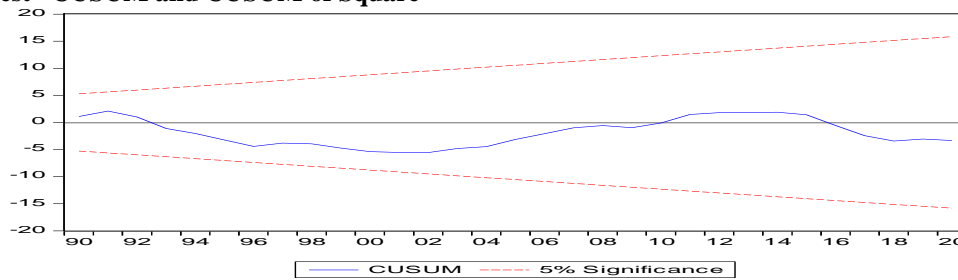


Figure 1: CUSUM Stability Test

Source: Compilation from E-view 9

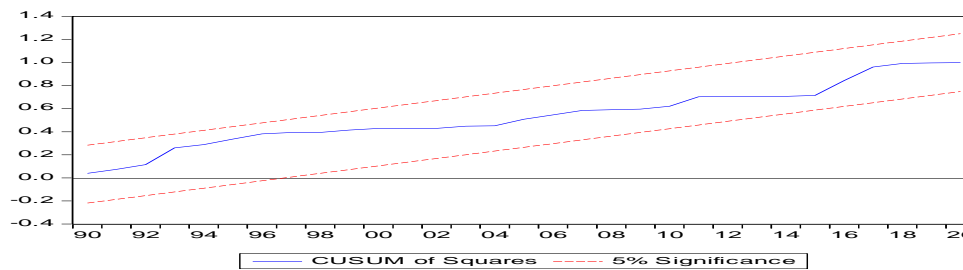


Figure 2: CUSUM of Square Stability Test

Source: Compilation from E-view 9

From the plots in Figures 4 and 5, the results showed green lines in between the upper and lower critical bands. As a result, the research rejects the H_0 of no stability in the parameters and error terms, and infers that presence of stabilities are revealed in the parameters and error terms in the model.

Policy Implications of the Results

The research investigated the impact of exchange rate depreciation on the developments of foreign trade in Nigeria for the 1986-2020, through the application of the ARDL model. From the results, it was discovered that exchange rate exerts an insignificant and positive effect on exports in both the short-run and the long-run. Thus, it is averagely estimated that 1% rise in the depreciation of exchange rate will lead exports growth of Nigeria to increase by 0.08% in the short-run and by 0.14% in the long-run. In the same way, the results showed that exchange rate has a significant and negative effect on imports in the short-run whereas it exerts a positive and significant influence on imports of Nigeria in the long-run. Hence, the study estimated on the average that any economic policy capable of increasing the depreciation in exchange rate by 1% will result in decline in imports growth by 1.1% in the short-run and by 1.3% increase in imports growth in the long-run. The negative sign revealed by the coefficient of exchange rate satisfied a priori expectation in the short-run but in the long-run, the positive sign violates economic theory, which implies that Nigeria appears to be experiencing highly inelastic foreign import demand. It is on this ground that exchange rate depreciation may have positive relationship with imports growth of the country.

Furthermore, the ARDL model showed that exchange rate has a significant and negative effect on total trade volume in the short-run whereas in the long-run, exchange rate affects total trade volume positively and significantly. Therefore, the study estimated averagely that any monetary policy which improves exchange rate depreciation by 1% will result in decline in total trade volume by 0.9% in the short-run and increased total trade volume by 0.43% in the long-run. Since the ARDL bound test indicated evidence of long-run equilibrium relationship among the variables, the study ignore the short-run negative of the exchange rate variable but focused on the long-run coefficient sign of the variable. In the same vein, the results revealed that depreciation in exchange rate has a significant causal relationship with total trade volume in Nigeria. Thus, the research estimated that 1% improvement in exchange rate resulting from monetary policy adjustment will lead to significant increase in total trade volume in the Nigerian economy.

Contribution to Knowledge

This study is built upon other scholarly research work conducted on the topic under consideration or any other related topics across countries of the world. From the empirical review, it is observed that most scholars lay more emphasis on the influence of exchange rate movements on either foreign trade or exports or imports and utilized single linear equation in the research.

However, this study made significant contribution in building the pool of knowledge in literature by disaggregating the dependent variable into exports, imports and foreign trade; and modified the independent variable by adding interest rate and private domestic investment. To achieve this goal, the study utilized three equations with exports, imports and total trade volume considered as dependent variables. Hence, it is discovered that exchange rate depreciation exerts a positive and insignificant influence on exports in both the short-run and the long-run. More so, the results indicated that exchange rate depreciation has a negative and significant effect on both the imports and total trade volume in the short-run; and in the long-run, it has a positive and significant impact on imports and total trade volume in Nigeria. More so, it was found that interest rate has a negative and significant effect on total trade in both the short-run and the long-run; while private domestic investment exerts positive and insignificant impact on total trade in the short-run, and positive and significant influence on total trade in the long-run.

V. Conclusion and Recommendations

This study was carried out with the objective of finding the effect of exchange rate depreciation on foreign trade in Nigeria from 1986 to 2020. To find empirical results, ARDL model was engaged to estimate the variables of the study; with the results indicating evidence of long-run equilibrium relationship among the variables. It was further disclosed that exchange rate exerted a positive but insignificant effect on exports while it had a negative and significant impact on imports in the short-run; and in the long-run, it influenced imports positively and significantly. Having undertaken this research with adequate identification method, the study among others: that monetary authority should intensify its policy measures in re-formulating and implementing exchange rate policies that target improved exports of the nation. This can be done by encouraging through low interest loans, massive production of oil and non-oil products such as agricultural products, agro-allied industries, small and medium scale industries; as well as promote production of oil domestically to strengthened exports and reduce import dependency of the country.

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